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## RAW SEQUENCE LISTING

DATE: 07/29/2004

PATENT APPLICATION: US/10/502,040

TIME: 15:45:40

Input Set : A:\63358.app

Output Set: N:\CRF4\07292004\J502040.raw

3 <110> APPLICANT: Liao et al.  
 5 <120> TITLE OF INVENTION: ALANINE 2,3-AMINOMUTASE  
 7 <130> FILE REFERENCE: 63358-09  
 C--> 10 <140> CURRENT APPLICATION NUMBER: US/10/502,040  
 C--> 10 <141> CURRENT FILING DATE: 2004-07-19  
 10 <150> PRIOR APPLICATION NUMBER: PCT/US03/01635  
 11 <151> PRIOR FILING DATE: 2003-01-17  
 14 <150> PRIOR APPLICATION NUMBER: US 60/350,727  
 15 <151> PRIOR FILING DATE: 2002-01-18  
 17 <150> PRIOR APPLICATION NUMBER: US 60/375,785  
 18 <151> PRIOR FILING DATE: 2002-04-25  
 20 <160> NUMBER OF SEQ ID NOS: 66  
 22 <170> SOFTWARE: PatentIn version 3.1  
 24 <210> SEQ ID NO: 1  
 25 <211> LENGTH: 40  
 26 <212> TYPE: DNA  
 27 <213> ORGANISM: Artificial Sequence  
 29 <220> FEATURE:  
 30 <223> OTHER INFORMATION: PCR primer  
 32 <400> SEQUENCE: 1  
 33 gcgcgaggag gagttcatat gaaaaacaaa tgggtataaac 40  
 36 <210> SEQ ID NO: 2  
 37 <211> LENGTH: 36  
 38 <212> TYPE: DNA  
 39 <213> ORGANISM: Artificial Sequence  
 41 <220> FEATURE:  
 42 <223> OTHER INFORMATION: PCR primer  
 44 <400> SEQUENCE: 2  
 45 cgggcaccgc ttcgaggcgg ccgcaccatt cgcattg 36  
 48 <210> SEQ ID NO: 3  
 49 <211> LENGTH: 1416  
 50 <212> TYPE: DNA  
 51 <213> ORGANISM: Bacillus subtilis  
 53 <400> SEQUENCE: 3  
 54 ttgaaaaaca aatggtataa accgaaacgg cattggaagg agatcgagtt atggaaggac 60  
 56 gttccggaag agaaatggaa cgattggctt tggcagctga cacacactgt aagaacgtta 120  
 58 gatgatitaa agaaagtcatt taatctgacc gaggatgaag aggaaggcgt cagaatttct 180  
 60 accaaaacga tccccctaaa tattacacct tactatgctt ctttaattgga ccccgacaat 240  
 62 ccgagatgcc cggtagcgc gtagtctgtg ccgctttctg aagaaatgca caaaacaaaa 300  
 64 tacgatctgg aagaccgcgt tcatgaggat gaagattcac cggtagccgg tctgacacac 360  
 66 cgctatcccg accgtgtgct gtttcttgct acgaatcaat gttccatgta ctgcccgtac 420  
 68 tgcacaagaa ggcgcttttc cggacaaatc ggaatgggcg tccccaaaaa acagcttgat 480  
 70 gctgcaattg cttatatccg ggaaacaccc gaaatccgcg attgtttaat ttcaggcggg 540

**ENTERED**

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72 gatgggctgc tcatcaacga ccaaatttta gaatatattt taaaagagct gcgcagcatt    600
74 ccgcatctgg aagtcacag aatcggaaca agagctcccg tcgtctttcc gcagcgcat    660
76 accgatcatc tgtgcgagat attgaaaaaa tatcatccgg tctggctgaa caccatttt    720
78 aacacaagca tcgaaatgac agaagaatcc gttgaggcat gtgaaaagct ggtgaacgcg    780
80 ggagtgcggg tcggaaatca ggctgtcgta ttagcaggta ttaatgattc ggttccaatt    840
82 atgaaaaagc tcatgcatga cttggtaaaa atcagagtcg gtccttatta tatttaccaa    900
84 tgtgatctgt cagaaggaat agggcatttc agagctcctg tttccaaagg tttggagatc    960
86 attgaagggc tgagaggta tacctcaggc tatgcggttc ctacctttgt cgttgacgca   1020
88 ccaggcggag gaggtaaaat cgccctgcag ccaaactatg tcctgtcaca aagtctgcac   1080
90 aaagtgatct taagaaattt tgaagggtgtg attacgtcat atccggaacc agagaattat   1140
92 atccccaatc aggcagacgc ctatttttag tccgttttcc ctgaaaccgc tgacaaaaag   1200
94 gagccgatcg ggctgagtg cttttttgct gacaaagaag tttcgtttac acctgaaaat   1260
96 gtagacagaa tcaaaaggag agaggcatac atcgcaaatc cggagcatga aacattaaaa   1320
98 gatcggcgtg agaaaagaga tcagctcaaa gaaaagaaat ttttggcgca gcagaaaaaa   1380
100 cagaaagaga ctgaatgcgg aggggattct tcatga                                1416
103 <210> SEQ ID NO: 4
104 <211> LENGTH: 60
105 <212> TYPE: DNA
106 <213> ORGANISM: Artificial Sequence
108 <220> FEATURE:
109 <223> OTHER INFORMATION: PCR primer
111 <400> SEQUENCE: 4
112 tatcaattcg ttacaggcga tacatggcac gcttcggcgc gtgtaggctg gagctgcttc    60
115 <210> SEQ ID NO: 5
116 <211> LENGTH: 60
117 <212> TYPE: DNA
118 <213> ORGANISM: Artificial Sequence
120 <220> FEATURE:
121 <223> OTHER INFORMATION: PCR primer
123 <400> SEQUENCE: 5
124 gatgtcggcg ctggtgagta accagccgca gggataacaa catatgaata tcctccttag    60
127 <210> SEQ ID NO: 6
128 <211> LENGTH: 20
129 <212> TYPE: DNA
130 <213> ORGANISM: Artificial Sequence
132 <220> FEATURE:
133 <223> OTHER INFORMATION: PCR primer
135 <400> SEQUENCE: 6
136 ttaccgagca gcgttcagag                                20
139 <210> SEQ ID NO: 7
140 <211> LENGTH: 20
141 <212> TYPE: DNA
142 <213> ORGANISM: Artificial Sequence
144 <220> FEATURE:
145 <223> OTHER INFORMATION: PCR primer
147 <400> SEQUENCE: 7
148 cacctggcgg tgacaacat                                20
151 <210> SEQ ID NO: 8
152 <211> LENGTH: 60

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153 <212> TYPE: DNA
154 <213> ORGANISM: Artificial Sequence
156 <220> FEATURE:
157 <223> OTHER INFORMATION: PCR primer
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160 gcggcgtgaa gtttcccaac ccgttctgcc tctcttcttc gtgtaggctg gagctgcttc      60
163 <210> SEQ ID NO: 9
164 <211> LENGTH: 60
165 <212> TYPE: DNA
166 <213> ORGANISM: Artificial Sequence
168 <220> FEATURE:
169 <223> OTHER INFORMATION: PCR primer
171 <400> SEQUENCE: 9
172 ttacaacggt accgggtggt ctttctcgcc tttcttaaac catatgaata tcctccttag      60
175 <210> SEQ ID NO: 10
176 <211> LENGTH: 51
177 <212> TYPE: DNA
178 <213> ORGANISM: Artificial Sequence
180 <220> FEATURE:
181 <223> OTHER INFORMATION: PCR primer
183 <400> SEQUENCE: 10
184 cacaaaacaa aatacgatat ggaagaccgc ctccatgagg atgaagattc a              51
187 <210> SEQ ID NO: 11
188 <211> LENGTH: 51
189 <212> TYPE: DNA
190 <213> ORGANISM: Artificial Sequence
192 <220> FEATURE:
193 <223> OTHER INFORMATION: PCR primer
195 <400> SEQUENCE: 11
196 tgaatcttca tcctcatgga gcgggtcttc catatcgat tttgtttgt g              51
199 <210> SEQ ID NO: 12
200 <211> LENGTH: 28
201 <212> TYPE: DNA
202 <213> ORGANISM: Artificial Sequence
204 <220> FEATURE:
205 <223> OTHER INFORMATION: PCR primer
207 <400> SEQUENCE: 12
208 gaatcaatgt tccgtatact gccgctac              28
211 <210> SEQ ID NO: 13
212 <211> LENGTH: 28
213 <212> TYPE: DNA
214 <213> ORGANISM: Artificial Sequence
216 <220> FEATURE:
217 <223> OTHER INFORMATION: PCR primer
219 <400> SEQUENCE: 13
220 gtagcggcag tatacggaac attgattc              28
223 <210> SEQ ID NO: 14
224 <211> LENGTH: 31
225 <212> TYPE: DNA

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## RAW SEQUENCE LISTING

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Input Set : A:\63358.app

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226 <213> ORGANISM: Artificial Sequence
228 <220> FEATURE:
229 <223> OTHER INFORMATION: PCR primer
231 <400> SEQUENCE: 14
232 gttcctacct ttgttgtaga cgcaccaggc g 31
235 <210> SEQ ID NO: 15
236 <211> LENGTH: 31
237 <212> TYPE: DNA
238 <213> ORGANISM: Artificial Sequence
240 <220> FEATURE:
241 <223> OTHER INFORMATION: pcr primer
243 <400> SEQUENCE: 15
244 cgcttggtgc gtgtacaaca aaggtaggaa c 31
247 <210> SEQ ID NO: 16
248 <211> LENGTH: 23
249 <212> TYPE: DNA
250 <213> ORGANISM: Artificial Sequence
252 <220> FEATURE:
253 <223> OTHER INFORMATION: PCR primer
255 <220> FEATURE:
256 <221> NAME/KEY: misc_feature
257 <222> LOCATION: (1)..(23)
258 <223> OTHER INFORMATION: y is t/u or c; s is g or c; b is g, c or t/u.
261 <400> SEQUENCE: 16
262 ttyatyggby tsggbaayat ggg 23
265 <210> SEQ ID NO: 17
266 <211> LENGTH: 20
267 <212> TYPE: DNA
268 <213> ORGANISM: Artificial Sequence
270 <220> FEATURE:
271 <223> OTHER INFORMATION: PCR primer
273 <220> FEATURE:
274 <221> NAME/KEY: misc_feature
275 <222> LOCATION: (1)..(20)
276 <223> OTHER INFORMATION: y is t/u or c; s is g or c; b is g, c or t/u; w is a or t/u;
n is
277 a, c, g or t/u.
280 <400> SEQUENCE: 17
W--> 281 gaygcncng tbwssggbgg 20
284 <210> SEQ ID NO: 18
285 <211> LENGTH: 21
286 <212> TYPE: DNA
287 <213> ORGANISM: Artificial Sequence
289 <220> FEATURE:
290 <223> OTHER INFORMATION: PCR primer
292 <220> FEATURE:
293 <221> NAME/KEY: misc_feature
294 <222> LOCATION: (1)..(21)
295 <223> OTHER INFORMATION: y is t/u or c; r is g or a; n is a, c, g or t/u.
298 <400> SEQUENCE: 18

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## RAW SEQUENCE LISTING

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Input Set : A:\63358.app

Output Set: N:\CRF4\07292004\J502040.raw

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W--> 299 catrttrtrtr caratyttnng c 21
302 <210> SEQ ID NO: 19
303 <211> LENGTH: 27
304 <212> TYPE: DNA
305 <213> ORGANISM: Artificial Sequence
307 <220> FEATURE:
308 <223> OTHER INFORMATION: PCR primer
310 <400> SEQUENCE: 19
311 ggtttacgag ggcgagaacg gcttgct 27
314 <210> SEQ ID NO: 20
315 <211> LENGTH: 1416
316 <212> TYPE: DNA
317 <213> ORGANISM: Bacillus subtilis
319 <220> FEATURE:
320 <221> NAME/KEY: CDS
321 <222> LOCATION: (1)..(1416)
322 <223> OTHER INFORMATION:
W--> 325 <400> 20
326 atg aaa aac aaa tgg tat aaa ccg aaa cgg cat tgg aag gag atc gag 48
327 Met Lys Asn Lys Trp Tyr Lys Pro Lys Arg His Trp Lys Glu Ile Glu
328 1 5 10 15
330 tta tgg aag gac gtt ccg gaa gag aaa tgg aac gat tgg ctt tgg cag 96
331 Leu Trp Lys Asp Val Pro Glu Glu Lys Trp Asn Asp Trp Leu Trp Gln
332 20 25 30
334 ctg aca cac act gta aga acg tta gat gat tta aag aaa gtc att aat 144
335 Leu Thr His Thr Val Arg Thr Leu Asp Asp Leu Lys Lys Val Ile Asn
336 35 40 45
338 ctg acc gag gat gaa gag gaa ggc gtc aga att tct acc aaa acg atc 192
339 Leu Thr Glu Asp Glu Glu Glu Gly Val Arg Ile Ser Thr Lys Thr Ile
340 50 55 60
342 ccc tta aat att aca cct tac tat gct tct tta atg gac ccc gac aat 240
343 Pro Leu Asn Ile Thr Pro Tyr Tyr Ala Ser Leu Met Asp Pro Asp Asn
344 65 70 75 80
346 ccg aga tgc ccg gta cgc atg cag tct gtg ccg ctt tct gaa gaa atg 288
347 Pro Arg Cys Pro Val Arg Met Gln Ser Val Pro Leu Ser Glu Glu Met
348 85 90 95
350 cac aaa aca aaa tac gat atg gaa gac ccg ctt cat gag gat gaa gat 336
351 His Lys Thr Lys Tyr Asp Met Glu Asp Pro Leu His Glu Asp Glu Asp
352 100 105 110
354 tca ccg gta ccc ggt ctg aca cac cgc tat ccc gac cgt gtg ctg ttt 384
355 Ser Pro Val Pro Gly Leu Thr His Arg Tyr Pro Asp Arg Val Leu Phe
356 115 120 125
358 ctt gtc acg aat caa tgt tcc gtg tac tgc cgc tac tgc aca aga agg 432
359 Leu Val Thr Asn Gln Cys Ser Val Tyr Cys Arg Tyr Cys Thr Arg Arg
360 130 135 140
362 cgc ttt tcc gga caa atc gga atg ggc gtc ccc aaa aaa cag ctt gat 480
363 Arg Phe Ser Gly Gln Ile Gly Met Gly Val Pro Lys Lys Gln Leu Asp
364 145 150 155 160
366 gct gca att gct tat atc cgg gaa aca ccc gaa atc cgc gat tgt tta 528

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RAW SEQUENCE LISTING ERROR SUMMARY  
PATENT APPLICATION: US/10/502,040

DATE: 07/29/2004  
TIME: 15:45:41

Input Set : A:\63358.app  
Output Set: N:\CRF4\07292004\J502040.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:17; N Pos. 6,9 ✓

Seq#:18; N Pos. 19 ✓

## VERIFICATION SUMMARY

DATE: 07/29/2004

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Input Set : A:\63358.app

Output Set: N:\CRF4\07292004\J502040.raw

L:10 M:270 C: Current Application Number differs, Replaced Current Application No  
L:10 M:271 C: Current Filing Date differs, Replaced Current Filing Date  
L:281 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:17 after pos.:0  
L:299 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:18 after pos.:0  
L:325 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:20,Line#:322  
L:585 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:22,Line#:582  
L:685 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:24,Line#:682  
L:1104 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:29,Line#:1101  
L:1473 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:33,Line#:1470  
L:1879 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:53,Line#:1876